9,5400

S/119/62/000/005/005/005
D201/D308

AUTHOR: Seleznev, G. V.

TITLE: A programming pulse device

PERIODICAL: Priborostroyeniye, no. 5, 1962, 24-25

TEXT: The device is to be used for time programming for any multiple time intervals and for producing pulses of fractions of a second to several minutes' duration. The design is based on coupling a coordinate grid to a step-distributor. The number of produced commands is determined by the number of program apertures in the coordinate grid. If larger capacity is required two such devices are connected in series. The commutating panel has vertical bars corresponding to 'units' from 0 to 9, horizontal bars for 'tens' - from 0 to 9, and plugs whose number corresponds to the required number of commands. Diodes prevent the reversal of current in the coordinate grid'cct which reversal might occur with four or more combinations. The rev counter may be either electromechanical or electronic, depending on the produced pulse repe-

Card 1/2

A programming oulse device

S/119/62/000/005/005/005
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titon frequency. The program is set up simply by inserting the plugs (of which diodes form an integral part) into corresponding holes of the commutation panel. When the arrangement is switched on, an electromagnet then moves a contact along the 'unit' bar until it meets a 'ten' connection and so on. There are 3 figures.

Card 2/2

24(7), 21 (1)
AUTHOR: Zaydel', A. N. SOV/53-68-1-9/17

TITLE: Spectrum Analysis of the Isotopic Composition (Spektral'nyy analiz izotopnogo sostava)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 68, Nr 1, pp 123-134 (USSR)

ABSTRACT: In the introduction the author discusses in short the need of a reliable analysis of the isotopic composition for research and industry, furthermore, he describes the mass spectrograph, its applicability, and the spectra with respect to shift and splitting of the spectral lines. Quantitative methods of isotope spectrum analysis (atomic spectra) were devised chiefly in four laboratories, two of them (unspecified) are in the USSR (investigation of H, Hg, U, Li, Pb); He, Li, Pb, U were investigated in France, and H, He, Li, Hg, Pb, and U in the United States. In this article reference is made to the publications of 1950-58. First, some spectral apparatus are mentioned: for H- and U-investigation the spectrograph ISP 51-A or the smaller diffractive apparatus DS-1; figure 3 shows the scheme of an apparatus for the photoelectric recording of the hyperfine structure of spectral lines (resolution up to 10^6). The light source used is then

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discussed in short, and the most frequently used cathodes as well as the cathodeless high-frequency discharge (water-cooled cathode - Fig 4a, cathode cooled with liquid nitrogen - Fig 4b) are mentioned. The author then describes in detail the intensity- and concentration measurement. In first approximation it may be assumed that the intensity ratio is equal to the concentration ratio of the corresponding isotopes. However, this ideal case is disturbed, in particular by the following factors: (a) light source: isotopic separation, various Doppler broadenings, transposition of the contours of the components of the isotopic and hyperfine structure, self-absorption, etc; (b) spectral apparatus: finite width of the instrumental contour, dispersed light. They are discussed in short, and the analysis methods and accuracies are demonstrated by the examples of hydrogen, helium, lithium, lead, and uranium and with the help of numerous spectrograms and microphotograms as well as two tables concerning lead isotopic analysis. The concentration determinations by the mass-spectrographic- and the spectral method are compared to one another. Finally, methods of calibration are discussed and an apparatus designed for absolute determination of the

isotope composition of lithium (Fig 10) is mentioned. In this connection the Russian authors L. A. Tumerman, Ye. N. Koren, Yu. I. Turkin, and G. V. Ostrovskaya are mentioned. There are 11 figures, 2 tables, and 20 references, 13 of which are Soviet.

24(4),24(7) SOV/53-69-1-10/11

AUTHORS: Bogdanova, I. P., Bochkova, O. P., Zaydel', A. N., Zakharova, V. M., Kagan, Yu. M., Kalitseyevskiy, N. I., Penkin, N. P., Chayka, M. P., Shukhtin, A. M., Lipis, L. V.

TITLE: Sergey Eduardovich Frish (Sergey Eduardovich Frish). On the Occasion of His Sixtieth Birthday (k shestidesyatiletiyu so dnya rozhdeniya)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 69, Nr 1, pp 165-167 (USSR)

ABSTRACT: On June 19th, 1959, the well-known Soviet physicist S. E. Frish, who made a name for himself especially in the field of spectroscopic optics, attained the age of sixty. He began his scientific work as a student at the fiziko-matematicheskoye otdeleniye Leningradskogo universiteta (Physico-mathematical Department of Leningrad University) under D. S. Rozhdestvenskiy. After completing his university studies he continued his work at the Gosudarstvennyy Opticheskiy institut (Optical State Institute). Since 1934 he held a chair for optics and supervised work at the Physics Department, first as dean and later as director of the Nauchno-issledovatel'skiy fizicheskiy institut LGU (Scientific Research Institute for Physics at Leningrad

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State University). In 1946 he was appointed Corresponding Member, AS USSR, and took active part in the work of the Academy. He is deputy chairman of the spectroscopy Committee, chief editor of the periodical "Optika i spektroskopiya" and member of the International Committee for spectroscopy at the UNESCO. He first concentrated his scientific interest on atomic energy, the systematics of atomic spectra, the Zeeman effect in the sodium and potassium spectrum, as well as upon experimental spectroanalytical investigations. In 1930 he started a cycle of works, which was devoted to optical methods of investigating the properties of the atomic nucleus. (An investigation of the interaction between nucleus and electron shell led to the discovery of the hyperfine structure of spectra). He investigated the hyperfine structure of Na and set up a rule concerning the interrelation between nucleus-spin- and parity. He further investigated the fine structure of isotope mixtures, the excitation mechanism of the higher atomic levels, and questions of the interaction of elementary

particles. Finally, mention is made of his pedagogical activities, especially his courses in physics (which are partly held together with A. V. Timoreva). There are 1 figure and 42 Soviet references.

PHASE I BOOK EXPLOITATION SOV/5090

Zaydel', A. N., N. I. Kaliteyevskiy, L. V. Lipis, and M. P. Chayka

Emissionnyy spektral'nyy analiz atomnykh materialov (Emission Spectrum Analysis of Atomic Materials) Leningrad, Fizmatgiz, 1960. 686 p. 8,000 copies printed.

Ed. (Title page): A. N. Zaydel', Professor; Ed.: Ye. Ya. Shreyder; Tech. Ed.: A. A. Zabrodina.

PURPOSE: This book is intended for specialists in optics and spectral analysis.

COVERAGE: The book deals with the techniques of spectral analysis used in the determination of the purity of atomic materials. The work does not discuss determinations of components in alloys, including Nb-U and U-Al used in reactor construction, and in alkali metal alloys, nor does it describe the analysis of atomic raw materials (ores and primary products of their processing) since this type of materials can be treated by conventional

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Emission Spectrum Analysis (Cont.) SOV/5090

spectral analysis methods. Ch. II, III, IX, XII, XIII, and XIV were written by A. N. Zaydel'; Ch. VI, X, and XI by N. I. Kaliteyevskiy; Ch. VII and VIII by L. V. Lipis; Ch. IV by M. P. Chayka; Ch. I by A. N. Zaydel' in cooperation with N. M. Kaliteyevskiy; and Ch. V. by M. P. Chayka and A. N. Zaydel'. The authors thank S. E. Frish, A. A. Petrov, S. M. Rayskiy, M. A. Yel'yashevich, A. A. Bashilov, V. V. Nalimov, and Ye. Ya. Shreyder. References accompany each of the three parts of the books.

TABLE OF CONTENTS:

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S/051/60/009/002/001/008
E201/E691

AUTHORS: Zaydel', A.N. and Ostrovskaya, G.V.

TITLE: A Spectroscopic Determination of the Isotopic Composition of Carbon

PERIODICAL: Optika i spektroskopiya, 1960, Vol. 9, No. 2, pp. 137-141

TEXT: The isotopic composition of carbon was determined using a spectroscopic apparatus employed earlier for the isotopic analysis of hydrogen (Refs. 3 and 4). The carbon spectra were excited in an electrodeless high-frequency discharge and recorded with a diffraction monochromator and a photomultiplier. The isotopic composition was deduced from the ratio of the intensities of $C^{13}O$ and $C^{12}O$ bands at 4131.0 and 4123.0 Å respectively. Typical recordings of the CO bands at C^{13} concentrations of 58 and 22% are shown in Figs. 1a and 1b respectively. Figs. 2 and 3 illustrate corrections of the intensity readings. The dependence of the I_{13}/I_{12} intensity ratio on the gas pressure in the discharge tube is shown in Fig. 4. The band intensity--isotopic composition calibration graph is given in Fig. 5. The range of C^{13} concentrations was varied from 1.1 to 58%. At low C^{13} concentrations (1-5%)

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E201/E691

A Spectroscopic Determination of the Isotopic Composition of Carbon

the scatter of the results corresponded to a coefficient of variation equal to 5-7%. At C^{13} contents amounting to 5-60% the coefficient of variation was 2-3%. One isotopic analysis required 0.1-0.2 cm^3 of gas and it took 10-15 min. Acknowledgment is made to I.G. Gvartsiteli for supplying methane enriched with C^{13}. There are 5 figures, 1 table and 5 references: 2 Soviet and 3 English.

SUBMITTED: November 18, 1959

Card 2/2

ZAYDEL', A.N.; FAFURINA, E.N.; YAKIMOVA, P.P.; YAKOVLEVA, S.S.

Spectral determination of rare earth elements extracted from minerals and ores. Vest. LGU 15 no.4:48-59 '60. (MIRA 13:2)
(Rare earths--Spectra)
(Yttrium--Spectra)

07454

S/057/60/030/012/001/011
B019/B056

26.2311

AUTHORS: Afrosimov, V. V., Glukhikh, V. A., Golant, V. Ye., Zaydel', A. N., Komar, Ye. G., Konstantinov, B. P., Malyshev, G. M., Malyshev, I. F., Monoszon, N. A., Stolov, A. M., Fedorenko, N. V.

TITLE: Plasma Studies With "Al'fa" Research Installation

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1381 - 1393

TEXT: A research installation for producing high-power pulsed discharges in a toroidal chamber with an average diameter of 3.2 m and an inner cross-section diameter of 1 m is described. The chamber is filled with hydrogen, and discharge is obtained at a pressure of about $2 \cdot 10^{-4}$ mm Hg, and with an external magnetic field of 180-720 oe. Discharges are produced by 2-3 msec electric pulses coming from a capacitor battery capable of storing $1.5 \cdot 10^{6}$ joules of energy. The entire installation is shown in a photograph, and is schematically represented in Fig.2.

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Plasma Studies With "Al'fa" Research Installation

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B019/B056

The electric and magnetic characteristics of a plasma discharge are described in detail, after which microwave studies, spectrum analyses, and studies of the atomic flux emitted by the plasma are discussed. The exporiments hitherto carried out on "Al'fa" show that the production and character of a discharge do not correspond to the general conceptions of a selfcontracting quasisteady discharge. The authors formed this opinion owing to the lack of a long plasma column, which follows from measurements of the electric and magnetic characteristics, from microwave studies, from the existence of a large azimuthal current, from the asymmetry of discharge, from the occurrence of oscillations therein, and from a considerable inhomogeneity of plasma. Besides, there is an inhomogeneous hydrogen-ion distribution, which is indicated by a large quantity of protons with energies exceeding 10 kev. An explanation of these effects is not possible as yet. There are 8 figures and 22 references: 13 Soviet, 3 Swedish, and 6 US.

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87454

Plasma Studies With "Al'fa" Research Installation

S/057/60/030/012/001/011
B019/B056

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the AS USSR). Nauchno-issledovatel'skiy institut elektrofizicheskoy apparatury (Scientific Research Institute of Electrophysical Apparatus)

SUBMITTED: July 15, 1960

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87458

S/057/60/030/012/005/011
B019/B056

24,2120 (1482, 1502, 1395)

AUTHORS: Zaydel', A. N., Malyshev, G. M., Shreyder, Ye. Ya., Berezin, A. B., Belyayeva, V. A., Gladushchak, V. I., Skidan, V. V., Sokolova, L. V.

TITLE: Spectral Examinations With "Al'fa" Research Installation. I. Study of the Character of the Spectrum and of the Ion Temperature

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1422 - 1432

TEXT: The spectrum of the discharge was investigated within the range of 350-5000 A. The spectrum of 350-2000 A was recorded by a vacuum spectrograph (600 lines/mm), the optical axis of the instrument was laid in a radical direction. From 2000 A to 5000 A a quartz spectrograph was used. Fig.1 shows several spectra recorded by the apparatus. For determining the ion temperature, the authors used the relation

$T = 1.95 \cdot 10^{12} \mu (\Delta\lambda/\lambda)^2$ (1), on the supposition that a Maxwell velocity

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Spectral Examinations With "Al'fa" Research Installation. I. Study of the Character of the Spectrum and of the Ion Temperature

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B019/B056

distribution and a pure Doppler broadening of the spectral lines exists. From the data concerning the temperature of the impurity ions obtained herewith it follows that, in dependence on the selection of the lines, from whose broadening the ion temperature is determined with (1), the calculated temperature varies about the range of $0.5 \cdot 10^6 - 15 \cdot 10^6$ °K. The calculated temperature value is the higher, the stronger the charge of the ion according to whose line broadening the temperature has been determined. This indicates an independent motion of the ions of different charges and a non-uniqueness of determining the plasma temperature from the Doppler broadening of the impurity atoms. The authors thank B. P. Konstantinov for discussions and N. I. Kaliteyevskiy, A. N. Razumovskiy, and M. P. Chayke for taking part in the work. There are 6 figures, 4 tables, and 7 references: 3 Soviet and 4 US.

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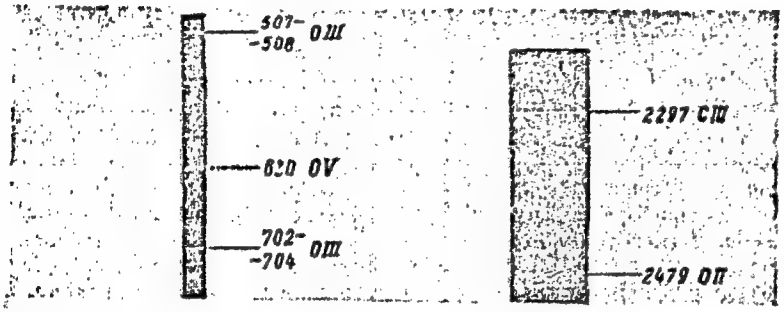
87458

Spectral Examinations With "Al'fa" Research Installation. I. Study of the Character of the Spectrum and of the Ion Temperature

S/057/60/030/012/005/011
B019/B056

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the AS USSR). Nauchno-issledovatel'skiy institut elektrofizicheskoy apparatury (Scientific Research Institute of Electrophysical Apparatus)

SUBMITTED: July 15, 1960



Card 3/3

87459
S/057/60/030/012/006/011
B019/B056

26.2322

AUTHORS: Zaydel', A. N., Malyshev, G. M., Moskalev, Ye. I., Ptitsyna, Ye. A., Sokolova, L. V., and Chashchina, G. I.

TITLE: Spectral Examinations With "Al'fa" Research Installation. II. Directed Ion Movements

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1433 - 1436

TEXT: Directed ion movements in "Al'fa" were measured by determining the spectral line shift of ions caused by the Doppler effect. The experiments were carried out with a low-dispersion quartz spectrograph and a spectrograph of the type ДФС-8 (DFS-8), having a dispersion of D = 6 A/mm. The pictures were taken in tangential direction and, part of the spectrum is shown in Fig.3. The ion velocities calculated from the line shift and the root-mean-square error are given in Table 1. As may be seen, the velocity of directed ion movement does not exceed 10^6 cm/sec, and increases with increasing ion charge. There are

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Spectral Examinations With "Al'fa" Research Installation. II. Directed Ion Movements

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3 figures, 1 table, and 5 references: 2 Soviet, 2 US, and 1 Swedish.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the AS USSR). Nauchno-issledovatel'skiy institut elektrofizicheskoy apparatury (Scientific Research Institute of Electrophysical Apparatus)

SUBMITTED: July 15, 1960

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87160

S/057/60/030/012/007/011
B019/B056

24.2120

AUTHORS: Zaydel', A. N., Malyshev, G. M., Berezin, A. B., and Razdobarin, G. T.

TITLE: Spectral Examinations With "Al'fa" Research Installation. III. Time Characteristics of Plasma Radiation

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1437 - 1446

TEXT: Two methods are described for recording the time characteristic of plasma: a photographic method with mechanical spectrum scanning, and a photoelectric method. The mechanical scanning of the photographic method was carried out by means of a slitted disk rotating in front of the slit of the spectrograph. The width of the disk slit varied from 0.5 to 2 mm; the speed at which the disk slit moved past the slit of the spectrograph was 5 m/sec. In the studies carried out on this spectrograph it was found that the width of lines changed during the radiation of the plasma. The widths of the NIV and OV lines and the discharge current are both graphically represented in Fig.3 as functions

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Spectral Examinations With "Al'fa" Research Installation. III. Time Characteristics of Plasma Radiation

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of time. In the description of the photoelectric method, measurement of spectral line intensity with the aid of a photomultiplier and an oscilloscope is first discussed. By means of a two-beam oscilloscope, the intensity of the spectral line and the discharge amperage were recorded. From the Doppler shift, the authors were able to prove an ordered motion of ions at sufficiently high speeds, and with the aid of a divider shown in Fig.9 for the spectral lines, a shift of spectral lines could be determined with high accuracy. "Al'fa" did not show any difference in the course of intensity of the two halves of the line. Intensity oscillations of the lines having a frequency of 10^5 cps are explained by a Doppler shift and by an ordered motion of the NIV ions along the direction of observation. Laboratory Assistant V. V. Semenov took part in the work. The authors thank B. P. Konstantinov for his interest. There are 10 figures and 5 references: 1 Soviet, 2 Hungarian, 1 British, and 1 Swedish.

Physics-Tech Inst. AS USSR.

Card 2/2 Sci Res Inst Electrophysical Apparatus

ZAYDEL, A N

Reports presented at the 5th Intl. Conference on Ionization Phenomena in Gases. Munich, 28 August - 1 September 1961.

a. G A Bazilevskaya, A N Andrianov, V F Demichev and V I Vasilyev

"Investigation of a Pulse Discharge in a Hollow Cylindrical Gas Sheath"

b. B G Brezhnev Ya S Maksimov

"Energy Measurements of Fast Electrons Formed During a Powerful Pulse Discharge" Chamber

c. A B Berezin, A N Zaydel, and G M Malyshev

"On a Method of Spectroscopic Investigation of the Hydrogen Discharge Chamber Walls Interactions"

d. V V Kitayeva N N Sobolev

"On the Hydrogen Lines Broadening Under the Carbon Arc and Detonation Wave Conditions"

e. S G Alikhanov R A [illegible], A V Komin, G G Podlesnyy, G L [illegible]

" An Investigation of Plasma Diffusion in the Magnetic Field"

f. V S Komelkov, Yu V Skvortsov V N Tereshchenko S S Tserevitinov

"Dynamical Current Cord"

g. N N Sobolev

"A Spectroscopically Studied State of Gases Following the Detonation Wave"

h. B N Klin, Ye S Solovyev N V Fedorenko

"Molecular Hydrogen Ionization by Gas Hydrogen Atoms"

i. I P Flaks, G N Ogurtsov

"Ionization of Gases Induced by Multi-charged Ions"

j. P M Morozov, L N [illegible]

"The Source for Molecular Hydrogen Ions Formation at the Ogra Device"

k. A L Bezlatchenko V V Kuznetsov N P Malakhov N N [illegible]

"Injection of an Ionic Beam into the Ogra Magnetic Trap"

l. V Ye Yurasova

"On Directed Ejection of Particles from a Copper Single Crystal Sputtered by Bombardment with Ions"

S/051/61/010/001/003/017
E201/E491

11.4130

AUTHORS: Zaydel', A.N., Razumovskiy, A.N. and Chayka, M.P.

TITLE: A Spectroscopic Analysis of the Isotopic Composition of Lithium

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.15-18

TEXT: The authors describe a spectroscopic method for analysis of the isotopic composition of lithium, based on measurements of the component intensities of a resonance doublet at 6707.8 Å. A hollow-cathode discharge tube was used as the light source. It is shown schematically in Fig.1. The isotopic structure was recorded using a Fabry-Perot interferometer. To separate out the required line, a diffraction-grating monochromator was employed. The optical part of the apparatus is shown in Fig.2, where 1 and 5 are slits, 2, 4, 6 and 9 are objectives, 3 is a diffraction grating, 7 is a Fabry-Perot interferometer enclosed in a chamber 8, 10 is an iris diaphragm, 11 is a receiver (a photomultiplier ФЭУ-22 (FEU-22)). The pressure in the chamber 8 was varied periodically, using an automatic

√C

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A Spectroscopic Analysis of the Isotopic Composition of Lithium

control device (Fig.3). The signal from the photomultiplier was passed to a d.c. amplifier and then to an automatic recorder ЭПП-09 (EPP-09). An example of the records obtained is given in Fig.4 for a sample containing 2% Li^6. Neglecting self-absorption and other effects, the concentrations were calculated from

$$\frac{C_{Li6}}{C_{Li7}} = \frac{I_b}{I_a} - \frac{1}{2}$$

where I_b, I_a are the intensities of the components of the 6707.8 Å line shown in Fig.5. A calibration curve used in calculations is given in Fig.6. The sensitivity of the method described here was 0.5% Li^6. The errors were represented by a coefficient of variation of 0.15 to 0.7% for Li^6 contents from 40 to 90%. The time required for each analysis was 10 to 15 min and the minimum amount of lithium was 5 to 10 μg (0.05 mg LiCl).

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E201/E491

A Spectroscopic Analysis of the Isotopic Composition of Lithium

Acknowledgments are made to T.N.Krylova for preparation of the interferometer plates and G.M.Malyshev for help in some stages of this work. The work was carried out in 1956-7. There are 6 figures and 10 references: 4 Soviet and 6 non-Soviet (one of which is translated into Russian).

/C

SUBMITTED: January 21, 1960 (to the Editor of "Atomnaya Energiya")
April 16, 1960 (to the Editor of "Optika i Spektroskopiya")

Card 3/3

S/051/61/010/005/001/006
E032/E114

11,3500

AUTHORS: Zaydel', A.N., and Korennoy, Ye.P.

TITLE: Spectroscopic Determination of the Isotopic Composition and Concentration of Lithium in Solutions

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.5, pp. 570-576

TEXT: A method has been developed for the spectroscopic absorption analysis of the isotopic composition of lithium. The method is based on the absorption of the resonance line of lithium 6708 Å. In distinction to normal methods based on high-resolution instruments (F.F. Gavrilov, Ref.1) the present method can be used with a low-dispersion monochromator, and was originally described by the first of the present authors in this journal, Vol.4, 701, 1958. The absorbing medium was the flame of an air-acetylene burner into which the specimens to be analyzed were introduced in the form of water solutions of LiCl. The source of radiation was a hollow-cathode discharge tube containing pure lithium isotopes. A block diagram of the apparatus is shown in Fig.3, in which 1 is the hollow cathode discharge tube. The tube is supplied from

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Spectroscopic Determination of the Isotopic Composition and Concentration of Lithium in Solutions

a high-voltage stabilized rectifier (A.G. Zhiglinskiy, Ref.6) and the discharge current is of the order of 100 mA. Li^7-enriched lithium was deposited electrolytically on the cathode from an acetone solution of LiCl. Natural lithium metal was also used and a small piece of it was placed in the cathode. The discharge occurred in a stream of helium at a pressure of 1 mm Hg. The gas system for the discharge tube is illustrated in Fig.4. The helium is let into the system from the cylinder 13 through the regulated capillary 4. The latter is in the form of a bent brass tube 1.5 mm in diameter. The rate of supply of helium was adjusted by bending this tube. The helium gas is allowed to enter the discharge tube 3 through the capillary 1 (0.3 mm in diameter) and is removed by a backing pump through the capillary 2 (0.4 mm in diameter) and the valve 9. The consumption of helium does not exceed 5×10^{-4} ℓ atm/hr. The beam of light from the discharge tube is modulated by the perforated disc (4 in Fig.3) at a frequency of 300 cps and is passed through the flame 5 of

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Spectroscopic Determination of the Isotopic Composition and Concentration of Lithium in Solutions

the air-acetylene burner into which the specimens to be analyzed and standard solutions are introduced. The burner has a brass end-piece which carries an 18 x 1 mm slit. The transverse cross-section of the flame is 20 x 10 mm. The analytical line 6708 Å was separated out with the aid of a diffraction monochromator having a dispersion of about 30 Å/mm. The use of the low-dispersion monochromator led to some difficulties since the helium line 6678 Å lies in the neighbourhood of the analytical line. The disc was in the form of a ФЭУ-22 (FEU-22) photomultiplier which in Fig.3 is indicated by 7. The constant component of the signal was cut off by the amplifier 15 which was tuned to the modulation frequency. The circuit of the amplifier is shown in Fig.5. The amplification coefficient was 110 and the amplified signal was recorded by the voltmeter 14, МВЛ-1 (MVL-1). The specimens to be analyzed should have the same atomic concentration of lithium, since the absorption by the flame depends not only on the isotopic composition of lithium but also on the total

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E032/E114

Spectroscopic Determination of the Isotopic Composition and Concentration of Lithium in Solutions

concentration of lithium atoms in the flame. The device therefore incorporates an auxiliary apparatus for the emission analysis of the lithium concentration in the solution. In this analysis use is made of light reflected from the disc 4, which is then intercepted by the entrance slit of the monochromator 8 МС-111(MS-11). The analytical line is recorded by the photoamplifier 9 ФЭУ-22 (FEU-22). The signal is amplified by the tuned amplifier 10 (A.M. Bonch-Bruyevich, Ref.7) and recorded by the voltmeter 11 МВЛ-1 (MVL-1). The absorption coefficient α was determined from the following formulae:

$$\lg \frac{J}{I_{06}} = \lg \frac{(2e^{-\alpha} + 1)}{3} - 0.434\alpha C_6 \qquad (3)$$

$$\lg \frac{J}{I_{07}} = \lg \frac{e^{-\alpha(1+C_6)} \quad 2e^{-\alpha(1-3C_6)} + 1}{3} \qquad (4)$$

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Spectroscopic Determination of the Isotopic Composition and Concentration of Lithium in Solutions

where J is the transmitted intensity, I_0 is the incident intensity, and subscripts 6 and 7 refer to the lithium isotopes. Furthermore, n_6 and n_7 are the atomic concentrations of the lithium isotopes in the solution, $C_6 = n_6/(n_6+n_7)$, $C_7 = n_7/(n_6+n_7)$, and l is the path length. Fig.8 shows an experimental graph of $\lg (J/I_{07})$ as a function of C_6 (in relative units). In this figure the curves marked a, b and c refer to the following concentrations of lithium in mg/litre respectively: 50, 100 and 200. The method can be used in the rapid determination of the isotopic concentration of lithium with $C_6 > 0.60$ and a total concentration of lithium in the solution $>$ 50 mg/litre. The time necessary for a single analysis is two to three minutes, and the amount of solution required is about 5 cc. The accuracy of the method which was represented by a "variation coefficient" was found to be 0.6%.
There are 8 figures, 2 tables and 8 references: 5 Soviet and 3 non-Soviet.
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E032/E114

Spectroscopic Determination ....

SUBMITTED: June 21, 1960

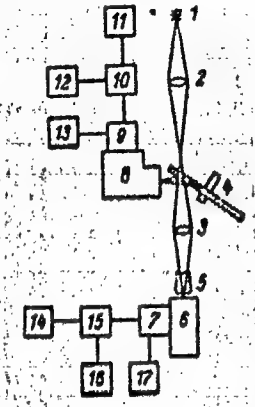

Fig.3

Legend of Fig.3

1. radiation source (hollow cathode discharge tube)
2, 3. condensator lenses
4. modulator disc
5. flame of burner
6, 8. monochromators
7, 9. photomultipliers
10, 15. tuned amplifiers
11, 14. recording devices
12, 16. sources of supply for amplifiers
13, 17. sources of supply for photo-multipliers

Card 6/ 8

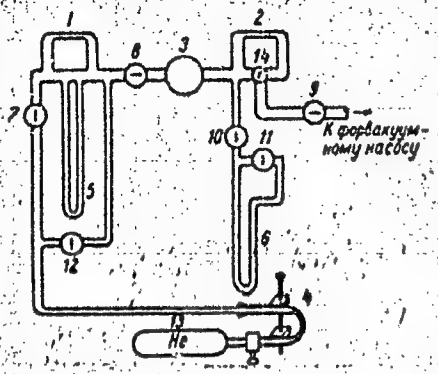

Fig. 4

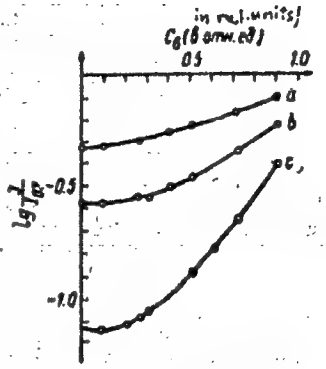

Fig. 8

Card 7/8

20872

S/051/61/010/005/001/006
E032/E114

Spectroscopic Determination.....

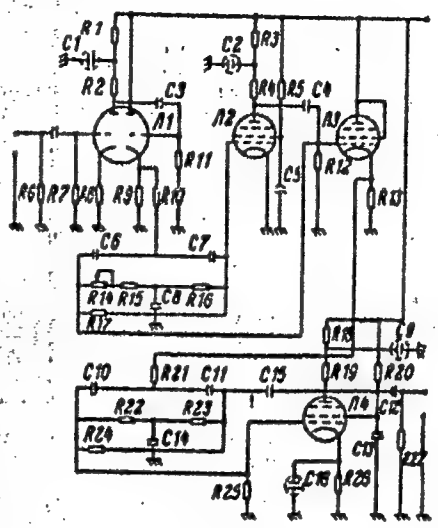

Fig.5

R1, R3, R9, R8 = 1T; R2, R14 = 12T; R4 = 8.2T; R5 = 8.2T; R6, R11 = 1.5; R7, R17, R24 = 1.0; R8, R13 = 500; R10=13T; R12 = 1.1; R15, R19 = 20T; R16, R21 = 24T; R20, R22, R23 = 51T; R25 = 4.7; R26 = 910; R27 = 7T; C1, C2, C9 = 10.0; C3, C4, C12, C15 = 0.25; C6, C7, C14 = 0.02; C10, C11 = 0.01; C5 = 0.04; C16 = 50.0;
Л1 — 6Н2П; Л2, Л3, Л4 — 6Ж3П.

Card 8/8

ZHIGLINSKIY, A.G.; ZAYDEL', A.N.; KARKLINA, E.A.

Study of a direct current arc at elevated pressure. Opt. i spektr. 10 no.6:697-701 Je '61. (MIRA 14:8)
(Electric arc)

ZAYDEL', A.N.; OSTROVSKAYA, G.V.; PETROV, A.A.

Spectroscopic method for determining the isotopic composition of nitrogen. Opt.i spektr. 10 no.5:673-676 My '61. (MIRA 14:8)
(Spectrum analysis) (Nitrogen--Isotopes)

ZHIGLINSKIY, A.G.; ZAYDEL', A.N.; KUND, G.G.

Autocollimation setup for the photoelectric recording of hyperfine structure. Opt. i spektr. 10 no.6:792-796 Je '61. (MIRA 14:8)

(Interferometry) (Photoelectric measurements)

32050
S/051/61/011/005/010/018
E202/E192

21.2500

AUTHORS: Zaydel', A.N., and Lazeyeva, G.S.

TITLE: Photoluminescence of solutions and crystals of gadolinium salts

PERIODICAL: Optika i spektroskopiya, v.11, no.5, 1961, 636-641

TEXT: Photoluminescence of crystals and solutions of gadolinium chlorides and sulphates was studied by means of excitation with light from the iron spark (2700-2800 Å). It was found that the intensity of fluorescence of the neutral and weakly acidic solutions is reduced by exposure to the light of the iron spark. The part of the spectrum responsible for this quenching was in the region of short wavelengths < 2600 Å. The quenching did not reappear upon addition of HCl or H_2O_2. Only qualitative observations were made in respect of the quenching. Details of the fluorescence spectra of chlorides and sulphates were given, including a number of new bands, the presence of which was interpreted as the superimposition of the electron transition frequency in the 4f configuration on the Raman valency vibrations of the hydroxyl group. Unable to determine with high accuracy

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the absolute values of the decay time τ of luminescence for each band, the authors compared τ for a series of weak bands of luminescence and found that all these values are approximately equal and agree well with the decay time of the fundamental electron transition. Finally, it was concluded that the thermal equilibrium between the two outer excited states is reached in time which is insignificant as compared with the lifetime of these states themselves. N.V. Kozyeurova and Ye.V. Kondrat'yeva participated in the experiments. Ya.I. Larionov, G.P. Malakhova and G.S. Lazayeva are mentioned in the article for their contributions in this field.

There are 5 figures, 2 tables and 13 references: 6 Soviet-bloc and 7 non-Soviet-bloc. The English language references read as follows:

Ref.3: G.H. Dieke, L. Leopold. J.Opt.Soc.Amer., v.41, no.10, 1957.
Ref.6: G.H. Dieke, L.A. Hall. J.Chem.Phys., v.27, 465, 1957.

SUBMITTED: November 24, 1960

25639

24.3400 (1163, 1227, 1395)

S/032/61/027/007/010/01?
B110/B203

AUTHORS: Zaydel', A. N., Petrov, A. A., and Ustinov, V. B.

TITLE: Stabilized high-frequency generator with optic-electronic feedback

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 7, 196?, 904-907

TEXT: Reproducible measurement results of band intensities greatly depend on the stable operation of high-frequency generators in chemical and isotopic spectrum analyses. The two former authors (Ref. 9: Optika i spektroskopiya, 1, 977 (1956)) established a strict dependence of the bands excited by a BG-2 (VG-2) high-frequency generator, of the Balmer series of the hydrogen spectrum on the voltage applied. Well reproducible, relative intensities of the isotopic structural components of the hydrogen lines ($\sim 1\%$ at $I_H/I_D = 1$) were only obtained with stabilized feeding voltage.

The power supplied by the generator depends both on the absolute change in the mains voltage and on the generator circuit. For highest intensity it is required: $R_i = R_H$ (1), where R_i = internal generator resistance, R_H = re-

Card 1/3

Stabilized high-frequency generator ...

sistance of the discharge tube. Since R_H depends on the gas pressure, (1) is only fulfilled with a certain voltage. Therefore, in this generator circuit, optimum gas pressure must exist, at which mains voltage fluctuations show minimum effect. Fig. 1 shows the relative change in band intensity with changing generator voltage. In the VG-2 generator, the tangent of the angle of elevation of the function $I_H = f(U_{entr}) \approx 0.9$ is minimum, even at optimum gas pressure. The authors developed the stabilized ВГ-3 (VG-3) generator with ~0.3 kw (Fig. 2) with electron-optical feedback. Part of the light current from the discharge tube goes to the photoelectric converter. It is amplified in the feedback circuit, and arrives as modulation signal at the high-frequency generator. Thus, a light current change effects a feeding current change. The choice of transmission coefficient and polarity stabilizes the light intensity of the discharge tube. The multistage generator permits a reduction of the amplifying coefficient of the feedback circuit. The generator power is controlled in the weak stage $Л_2$ without mains currents. Thus, the feedback amplifier can operate with direct current and low amplifying coefficient. The $Л_1$ generator is built according to the induction circuit with 6П6 (6P6) tube.

Card 2/8

The generator power is modulated by a voltage change in the control grid of the Π_2 tube. A voltage amplitude of ~20 v is required for 100% modulation. The subsequent stages composed of Π_3, Π_4, and Π_5 tubes according to an ordinary push-pull circuit act as power amplifiers. The feedback circuit consists of the photoelectric converter and d-c amplifier, and the tubes Π_6, Π_7, Π_8. An ФЭУ-1 (FEU-1) light amplifier fed by rectifiers serves as converter. For 50% modulation, the amplifying coefficient must be ~300. When testing the apparatus with hydrogen, the authors established a slight effect of the U_{entr} fluctuations on I_H. The VG-3 generator operates with higher stability than VG-2, even without feedback, due to its independent excitation. In the new generator, the compensable voltage interval is ±10 v. In VG-3 with and without feedback (Fig. 1), the graphs for the pressure dependence on $\Delta I_H/\Delta U_{entr}$ show the existence of optimum pressures for most stable excitation conditions of the spectra. In the new generator, they are shifted in the direction of high pressures. The value $\Delta I_H/\Delta U_{entr}$ is nearly half of that in VG-2. The recording of the photocurrent obtained from the

H_β lines in luminescence excitation showed better radiation stability for the switched-on feedback. The high value of the variation coefficient (0.6%) (Table) is probably due to the instability of the photoelectric recording block. The apparatus can be used for mass isotopic analysis and spectrochemical gas analysis where a non-decomposed spectral light current is used as control signal. The authors thank Ye. S. Fedurkin who supervised the construction of the apparatus at the experimental production workshops of the NIFI LGU. There are 3 figures, 1 table, and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: Ref. 3: H. P. Broida, M. Selgin, H. J. Morowitz, J. Res. Nat. Bur. Stand., 52, 293 (1954).

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

Fig. 1. Dependence of the relative change in intensity of hydrogen lines with changing feeding voltage of the generator.
Legend: (1) VG-2 generator, (2) VG-3 generator without feedback, (3) VG-3 generator with feedback.
Card 4/8

ZAYDEL' A.N.; PILIPCHUK, B.I.; BABKO, A.K.; SHAYEVICH, A.B.; DOLINSKIY, Ye.F.

On the establishment of standards in the methods of presenting experimental data. Zav.lab. 27 no.10:1273-1278 '61.
(MIRA 14:10)

1. Fiziko-tekhnicheskiy institut AN SSSR (for Zaydel'). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut metrologii im D. I. Mendeleyeva (for Pilipchuk, Dolinskiy). 3. Institut obshchev i neorganicheskoy khimii AN USSR (for Babko). 4. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov (for Shayevich).
(Mathematical statistics)

S/057/61/031/002/001/015
B020/B056

24,2120 (1482,1502,1160)

AUTHORS: Zaydel', A. N., Malyshev, G. M., and Shreyder, Ye. Ya.

TITLE: Spectroscopic methods of studying a hot plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 129-166

TEXT: This is a review of articles dealing with spectroscopic studies of a hot plasma within the spectral range of some ten to 7,000 A. Plasma luminescence is characterized by the energy distribution over individual wavelengths, which, in turn, is characterized by the intensity, width, and contours of the spectral line, by the intensity of the continuous spectrum, etc. From the width of the spectral lines, the temperature of the ions, and from the shift of the spectral lines as a result of the Doppler effect, the direction of the controlled ion motion is determined. From the intensity of the spectral lines, the electron temperature in the plasma may be determined. The concentration of the charged particle is determined from the intensity of the continuous spectrum of bremsstrahlung, the contour of lines, as well as the shift of the boundary of the spectral series. On the basis of the intensity of the spectral lines of the

Card 1/3

impurities emitted from atoms and ions, their presence and concentration in the gas, in which the discharge occurs, may be determined. From the ratio between the line intensities, also the degree of ionization of the plasma may be determined. Fig. 1 shows the contours of the line NIV (λ = 3479 A) averaged over time and the radial direction by means of the experimental values obtained by L. V. Sokolova in the device "Al'fa". Fig. 2 was obtained on the basis of the spectrogram recorded by the spectrograph ИСП-28 (ISP-28), and Fig. 3 on the basis of the spectrogram made by means of the spectrograph ДФС-6 (DFS-6). Fig. 4 shows the optical scheme of an arrangement for measuring the velocity of controlled ion motion. The velocity of plasma ions measured by means of "Al'fa" is given in Table 1. Fig. 5 shows a diagram, from which it may be seen that the main part of light energy belongs to the wavelength range 1100-1400 A, which was used for measuring the absolute energy losses by means of thermoluminophores. For this purpose, the monochromator or spectrograph must be calibrated, two pairs of lines being selected for each element (Fig. 6). Further, the ratio between the main quantities of plasma luminescence was dealt with. The most important method of characterizing plasma

89155

Spectroscopic methods of ... S/057/61/031/[illegible]
B020/B056

luminescence with respect to time is long-time photographing. An example hereto is the spectrum shown in Fig. 7, which was taken by means of "Al'fa". Among the methods of investigating the time characteristics of line contours during the discharge pulse, the method of splitting spectral lines is mentioned. Mention is made of A. A. Vaynshteyn, I. I. Sobel'man, S. E. Frish, Yu. M. Kagan, V. I. Kogan, V. D. Kirillov, A. B. Berezin, S. Yu. Luk'yanov, and V. I. Sinitsyn. There are 14 figures, 2 tables, and 119 references: 57 Soviet-bloc and 55 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Institute of Physics and Technology imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: September 14, 1960

Card 3/14
3

ZAYDEL', A.N.; PROKOF'YEV, V.K.; RAYSKIY, S.M.; SHREYDER, Ye.Ya.; GUROV, K.P., red.; KUZNETSOVA, Ye.B., red.; BRUDNO, K.F., tekhn. red.

[Tables of spectral lines]Tablitsy spektral'nykh linii. Izd.2., ispr. i dop. Moskva, Fizmatgiz, 1962. 607 p. (MIRA 16:1)
(Spectrum analysis--Tables, etc.)

S/169/62/000/012/006/095
D228/D307

AUTHORS: Zaydel', A.N., Zhiglinskiy, A.G., and Kund, G.G.

TITLE: Isotopic spectral analysis

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 12, 1962, 10, abstract 12.80 (Byul. Komis. po opredeleniyu absolyutn. vozrasta geol. formatsiy, AN SSSR, no. 5, 1962, 60-62)

TEXT: The most prevalent, accurate, sensitive and universal method of mass-spectrometrically determining isotopic composition involves various difficulties of principle and technique. Spectral methods based on the differences existing in the atomic and molecular spectra of different isotopes employ the simpler equipment and require less time. Methods of spectrally determining the isotopic composition have been employed for a series of elements. The authors are now working on new methods for determining the isotopic composition of magnesium and oxygen. Equipment with a resolving power of up to 10^6 for studying atomic spectra generally con-

Card 1/2

Isotopic spectral analysis

S/169/62/000/012/006/095
D228/D307

sists of a light source (hollow cathode, high-frequency discharge tube), a pre-analyzing monochromator, a Fabri-Pero interferometer, and a photoelectric recording photometer. This apparatus determines the isotopic composition with a precision of from tenths of a percent to several percent of the specific concentration. Equipment for determining the isotopic composition from molecular spectra does not require an interferometer but usually contains a spectrograph with a resolving power of $\sim 10^4$; an arc serves as the light source. A new method is used for determining the isotopic composition of hydrogen and uranium, based on the measurement of the vapor with isotopic composition. Determinations of the isotopic composition of strontium carried out by the authors gave an accuracy of 3-5%, and lasted about 1½ hours. Work by the authors on improving the isotopic composition of lead increased the measurement accuracy for all isotope concentrations by 2-3% of the content of each isotope. 27 references.

[Abstracter's note: Complete translation]

Card 2/2

ZAYDEL', A.N.

Concerning I.S.Pominov's article "Absorption spectra of neodymium chloride in aqueous-alcoholic solutions at low temperatures."
Opt. i spektr. 12 no.6:804 Je '62. (MIRA 15:5)
(Neodymium chloride--Spectra) (Pominov, I.S.)

33431
S/048/62/026/001/007/018
B125/B104

24,3500 (1137,1138,1144)

AUTHORS: Zaydel', A. N., Lazeyeva, G. S., Ostrovskaya, G. V., and Yakimova, P. P.

TITLE: Luminescence of gadolinium salts

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 1, 1962, 74-80

TEXT: The luminescence spectrum of the Gd^{3+} ion has been thoroughly investigated on $GdCl_3 \cdot 6H_2O$ and on a 0.1-1% aqueous solution of $GdCl_3$; $Gd_2(SO_4)_3 \cdot 6H_2O$; $Gd_2(SO_4)_3$; $Gd_2(SO_4)_3$; and $Gd(C_2H_5SO_4)_3$. The spectra obtained from a synchronous spark phosphoroscope were recorded by a high-power E-517 (Ye-517) quartz spectrograph at room and liquid-air temperatures. Irradiation with the light of the iron spark sharply reduces the intensity of luminescence of the $GdCl_3$ solution (concentration ~0.1-1%) in neutral and weakly acid solutions, while it is much less decreased in acid solutions with HCl excess. The decrease differs with

Card 1/4

different solutions. The luminescence of solutions cannot be restored by boiling, addition of HCl or H_2O_2, or by precipitation of gadolinium.

Solutions of normal luminescence are obtained from the precipitated hydroxide after an appropriate treatment and dissolution in HCl. It was not possible to clarify the mechanism underlying the quenching of luminescence of the solutions. The two principal luminescence bands (3110 and 3060 Å) of the gadolinium salts are very narrow even at room temperature, and are split up into several components. The spectra of $GdCl_3 \cdot 6H_2O$ and $Gd_2(SO_4)_3 \cdot 8H_2O$ crystals exposed for a long time also exhibit a narrow doublet of 3002 and 3005 Å and a few weak diffuse bands. Apart from the principal bands which are more blurred, the spectra of solutions of gadolinium chlorides and sulfates are similar to those of crystals. Although the spectra of the individual salts show the same bands, they differ in many respects. The significance of the individual parts of the spectrum is shown. At liquid-air temperature, the structure of some diffuse bands becomes more distinct. According to Ye. V. Kondrat'yeva and G. S. Lazeyeva (Optika i spektroskopiya, 8, 132 (1960)),

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S/048/62/026/001/007/018
B125/B104

Luminescence of gadolinium salts

the photoluminescence of gadolinium salts has a lifetime $\tau \sim 10^{-3}$ sec and is damped exponentially. The exact lifetime for the 3110 Å line is $2 \cdot 10^{-3}$ sec, and that for the 3060 Å line had previously been estimated at 10^{-3} to 10^{-4} sec. The latest measurements of the authors with the synchronous spark phosphoroscope have shown that for the two lines mentioned before, the lifetimes are consistent with an error of about 10%. The band intensity ratio for 3110 and 3060 Å is nearly equal to 20 at room temperature. The damping times of the bands at 3470, 3220, 3180, and 3145 Å do not considerably diverge from that of the principal electron transition, which indicates that the bands are produced by the superposition of vibration frequencies over the frequency of the principal electron transition. There are 7 figures, 4 tables, and 12 references: 6 Soviet and 6 non-Soviet. The reference to English-language publications reads as follows: Dieke G. H., Hall L. A., J. Chem. Phys., 27, 465 (1957).

Card 3/4

33431
S/048/62/026/001/007/018
B125/B104

Luminescence of gadolinium salts

ASSOCIATION: Fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova (Physics Institute of Leningrad State University imeni A. A. Zhdanov)• Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

Card 4/4

S/048/62/026/007/002/030
B104/B138

AUTHORS: Zaydel', A. N., Zhiglinskiy, A. G., and Karklina, E. A.

TITLE: Study of the direct-current arc at elevated pressure

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 7, 1962, 855-857

TEXT: A previous paper (A. N. Zaydel' et al., Optika i spektroskopiya, 2, 28 (1957)) contains the description of an experimental system designed to study Li and Cu spectra in dependence on the pressure of the atmosphere surrounding the arc. At a surrounding CO_2 pressure of 7 atm. the Li I 6707, Li I 6103, Cu I 3274, and Cu I 3247 lines have much greater intensity than at 1 atm. The relative intensity of the Li lines was 11 times higher than that of the background. The plasma temperature is assumed to increase with pressure. The ratio between the emitting atom-molecule collision cross sections does not depend on pressure, and the optical density of the layer absorbing the two Li lines remains unaltered. Thus, the light source described in the previous paper provides a means for improving the accuracy of spectral analyses.
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S/048/62/026/007/002/030
B104/B138

Study of the direct-current arc at ...

There are 2 figures.

Card 2/2

ZAYDEL', A.N.; PETROV, A.A.

Spectral-isotope method of determining nitrogen in metals.
Zav.lab. 28 no.5:552-555 '62. (MIRA 15:6)

1. Leningradskiy gosudarstvennyy universitet.
(Gases in metals) (Nitrogen--Isotopes) (Spectrum analysis)

S/057/62/032/003/016/019
B117/B101

26.2214

AUTHORS: Zaydel', A. N., Konstantinov, O. V., and Malyshev, G. M.

TITLE: Spectroscopic measurements of ionic energies on a "Zeta"-type plant

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 3, 1962, 370 - 372

TEXT: The relationship between ionic energy and nuclear-charge number was checked on the basis of experimental data. A relationship between the ionic charge and the width of spectral lines of these ions had already been established in the first investigation conducted on the "Zeta" plant (Ref. 1, see below). Most of the results were satisfactorily described by the relations $E_i = \alpha z$ (1) or $E_i = \beta z^2$ (2). The data determined recently by Jones and Wilson (Ref. 10, see below) on the same plant concerning energies of ions with different mass and nuclear-charge numbers were explained by stating that the ionic energy as a function of charge was purely accidental. They suggested the following relations:

$$E_i \sim z^2/M_i, \quad E_i \sim M_i, \quad \text{and} \quad E_i = \text{const},$$

Card 1/3

Spectroscopic measurements of...

and used a two-term interpolation formula $E_i = E_o + (M_i/M_D)e$ (3) to attain an agreement between experimental and theoretical data. They assumed "thermalization" of the plasma. A calculation of the data given in the paper mentioned, however, showed that the experimental results were described equally well by the interpolation formula (1) with only one parameter as by formula (3) with two parameters. Thus, the investigations conducted on the "Zeta" and "Alfa" plants confirmed that the energy of ions increased with increasing nuclear-charge number. Formula (3) was found to give a deuteron temperature of ~100 ev. The mechanism of ionic acceleration by electrostatic fields of plasma waves, which is not impossible for the "Zeta" plant either, presupposes a deuteron temperature below the electron temperature (20 - 30 ev), i.e., near the value of α in (1). There are 1 table and 13 references: 2 Soviet and 11 non-Soviet. The four most recent references to English-language publications read as follows: Ref. 1: P. C. Thonemann et al., Nature, 181, 217, 1958; Ref. 10: B. B. Jones, R. Wilson. Report no. 057 read at the Konferentsiya po issledovaniyam v oblasti fiziki plazmy i upravlyaye-mogo yadernogo sinteza (Conference on Investigations in the Field of Plasma Physics and Controlled Nuclear Synthesis), Salzburg, 1961; A. S. Kaufman et al. Proc. Phys. Soc., 76, 17, 1960; B. Bernstein, R. M. Kulsrud. Phys. Fluids, 3, 937, 1960.

Card 2/3

S/057/62/032/003/016/019
B117/B101

Spectroscopic measurements of...

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: November 23, 1961

Card 3/3

ACCESSION NR: AT4025290 S/0000/63/000/000/0031/0035

AUTHORS: Zaydel', A. N.; Maly*shev, G. M.; Ostrovskaya, G. V.

TITLE: Use of laser for quantum diagnostics

SOURCE: Diagnostika plazmy* (Plasma diagnostics); sb. statey. Moscow, Gosatomizdat, 1963, 31-35

TOPIC TAGS: plasma, plasma diagnostics, plasma diagnostics with laser, laser, plasma electron density, plasma electron velocity distribution, plasma noise, ruby laser, light energy threshold, plasma free electron scattering

ABSTRACT: The range of electron densities and temperatures in which the scattering of light from a ruby laser by the plasma electrons can be used to determine the electron density and the electron velocity distribution function is evaluated. The expressions obtained under some simplifying assumptions are

Card 1/2

ACCESSION NR: AT4025290

$$n_{e\,min} = 10^{3}\frac{m^{2}c^{6}h d\alpha^{2}}{e^{4}\lambda\Delta\lambda\eta L E_{0}} \quad \text{and} \quad n_{e\,max} = \frac{130}{16\sqrt{2\pi\ln 2}}\cdot\frac{W_{0}}{c^{2}\nu l d}\cdot\frac{1}{I_{0}\left(\frac{h\nu}{2kT_{e}}\right)}\exp\left(\frac{h\nu}{2kT_{e}}\right).$$

for the minimum and maximum measurable electron density, respectively. It is assumed that the threshold of measured light energy is determined by the fluctuations in the number of photoelectrons produced upon scattering, and that the main sources of noise are the plasma intrinsic radiation and the light scattered by the various parts of the apparatus. While the latter cannot be evaluated in general form, an estimate made for a specially constructed small discharge tube shows that the proposed method can yield new data even with currently available equipment. Orig. art. has: 1 figure and 8 formulas.

ASSOCIATION: None

SUBMITTED: 190ct63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: PH NO REF SOV: 002 OTHER: 004

Card 2/3

KRIGLINSKIY, A. G.; ZAYDEL', A. N.

"Contemporary Methods for the Spectroscopic Determination of the Isotopes of the Elements."

report submitted to 11th Intl Spectroscopy Colloq, Belgrade, 30 Sep-4 Oct 63.

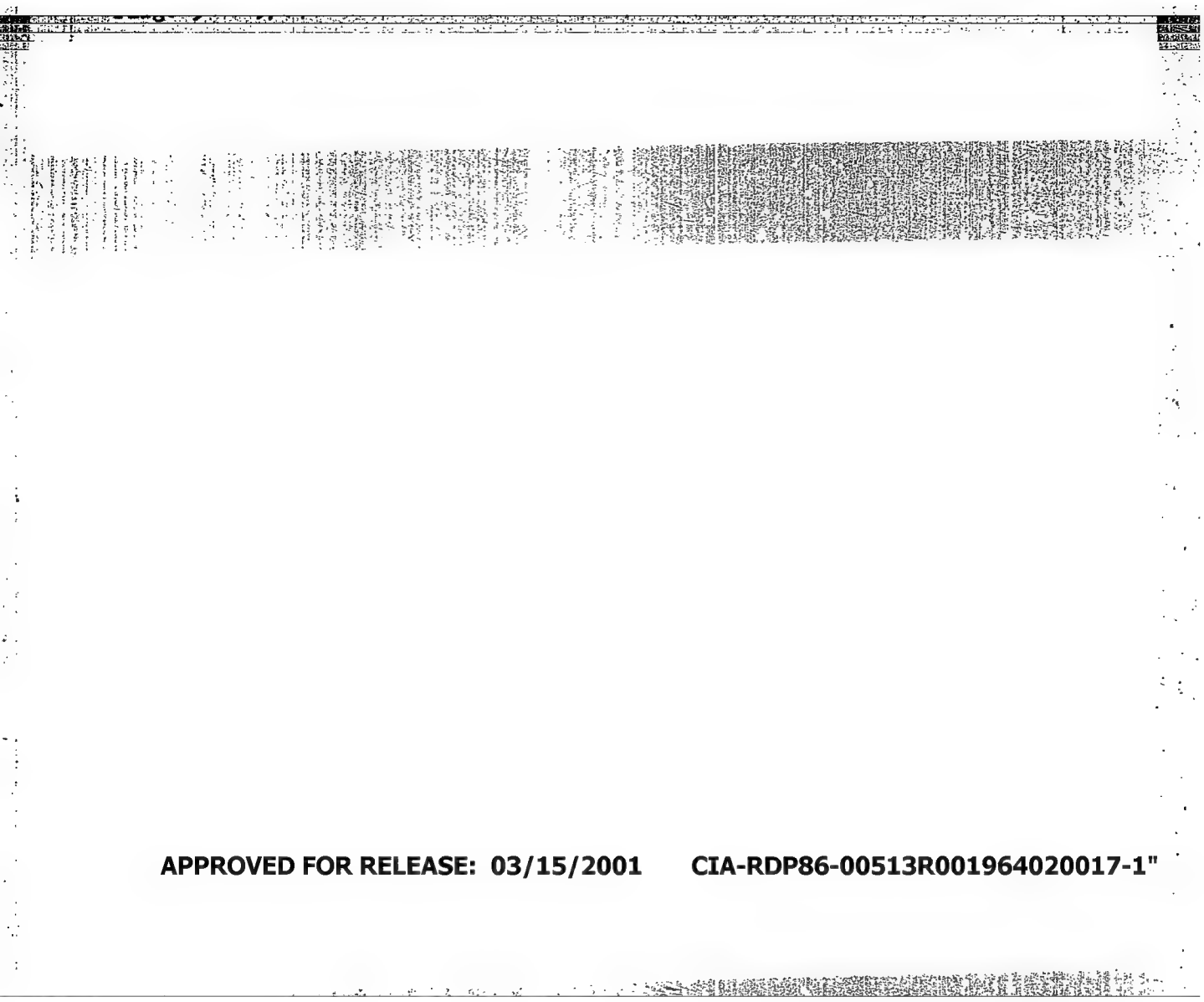
ZAYDEL', A. N.; PETROV, A. A.

"Spectral-Isotopic Method for the Determination of Gases in Metals."

report submitted to 11th Intl Spectroscopy Colloq, Belgrade, 30 Sep-4 Oct 63.

Physico-Technical Inst im A.F. Ioffe, AS USSR, Leningrad.

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001964020017-1"



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001964020017-1"

ZHIGLINSKIY, A.G.; ZAYDEL', A.N.; KUND, G.G.

Spectrum analysis of Pb^{204}. Geokhimiia no.1:83-91 Ja '63. (MIRA 16:9)

1. Leningradskiy gosudarstvennyy universitet.
(Lead isotopes--Spectra)

ZHIGLINSKIY, A.G.; ZAYDEL', A.N.; PETROV, A.A.

Spectral analysis of isotopic composition (survey). Zav.lab. 29 no.5:550-552 '63. (MIRA 16:5)

(Isotopes--Spectra)

ZAYDEL', A.N.; IVANOVA, T.F.; PETROV, A.A.; FEDOROV, V.V.; CHUMAKOVA, N.M.

Uses of the spectral-isotopic method of determination of gases in metals. Zav. lab. 29 no.6:693-695 '63. (MIRA 16:6)

1. Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta imeni A.A. Zhdanova.
(Gases in metals) (Spectrum analysis)
(Radioisotopes)

ZAYDEL', A.N.; KORENNOY, Ye.P.

Determination of the isotopic composition of lithium by the method of atomic absorption. Zav.lab. 29 no.12:1449-1450 '63. (MIRA 17:1)

1. Fiziko-tekhnicheskiy institut AN SSSR.

S/057/63/033/002/010/023
B108/B186

AUTHORS: Zaydel', A. N., Malyshev, G. M., and Ptitsyna, Ye. A.

TITLE: Spectroscopic measurement of the electron temperature in the "Alpha" machine

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 33, no. 2, 1963, 200-204

TEXT: The plasma electron temperature in the Alpha machine was determined from the intensity ratio of several pairs of spectral lines pertaining to different degrees of ionization of oxygen, nitrogen, and carbon. The intensity ratios were determined from the time-base sweep of the spectra (resolution 0.3-0.4 μsec) taken under the conditions (1) H_z = 180 oe, U = 10 kv, n = 350 pulses and (2) H_z = 180 oe, U = 15 kv, n = 150 pulses, in a hydrogen plasma ($\sim 1 \cdot 10^{-4}$ mm Hg). The results were evaluated with the formula

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$$kT_e = \frac{\Delta E_n - \chi_n}{2.3\left[\lg\frac{I_1}{I_2} - \lg\frac{A_{ki_1}}{A_{ki_2}} \cdot \frac{\sum_{i=0}^{i=i-1} A_{ki_2}}{\sum_{i=0}^{i=i-1} A_{ki_1}} \cdot \frac{f_{ok_1}}{f_{ok_2}} - \lg\frac{\nu_{ki_1}}{\nu_{ki_2}} - \lg\frac{E_{\beta_1}}{E_{\beta_2}} - 2\lg\frac{\chi_H}{\chi_n} - \lg\frac{8.3 \cdot 10^{15} \xi_n \cdot f_2}{n^2 f_1} - \lg\frac{kT_e}{\chi_n}\right]}. \quad (3)$$

where the subscripts 1 and 2 indicate the spectral lines from ions with a degree of ionisation of (i+1) and i, respectively. A_{ki} is the transition probability, f_{0k} the oscillator strength, ν_{ki} the frequency, E_β the excitation potential, I the intensity, χ_H and χ_n the ionization potential of hydrogen and of the given ion, n the main quantum number, ξ_n the number of electrons on the orbit with n. The factor g accounts for photorecombination on shells higher than n, while f_1 and f_2 are corrections for the cross sections of photorecombination and impact ionisation. The

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Spectroscopic measurement of ...

results showed that the electron temperature rises with increasing degree of ionization. The considerable deviations from the Maxwellian velocity distribution of the electrons can be explained by the simultaneous emission from ions of different degrees of ionization. Also the varying of the emission with time may affect the results. There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: February 23, 1962

Card 3/3

ACCESSION NR: AP4005080 S/0032/63/029/012/1449/1450

AUTHORS: Zaydel', A. N.; Korennoy, Ye. P.

TITLE: Determination of lithium isotope composition by the atomic absorption method

SOURCE: Zavodskaya laboratoriya, v. 29, no. 12, 1963, 1449-1450

TOPIC TAGS: lithium, isotope composition, atomic absorption method, isotope analysis, atomic absorption spectroscopy, absorption band method, lithium 6, lithium isotope composition, lithium isotope, atomic spectrum, lithium atomic spectrum

ABSTRACT: Two methods are presented for lithium isotope analysis: the atom absorption method and the emission method. Two types of solutions were used containing concentrations of 75 mg/liter and 100 mg/liter of lithium with lithium isotope Li^6 content varying from 2 to 45%. A hollow cathode containing pure Li^6 served as the radiation discharge tube in the first method. The isotope content was determined from

$$\lg\frac{I}{I_\infty}=\lg\frac{2e^{-a}+1}{3}=434aC_6.$$

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ACCESSION NR: AP4005080

where $C_6 = n_6/(n_6+n_7)$, n_6 = Li^6 atom concentration, n_7 = Li^7 concentration, and α - absorption coefficient. In the second method a torch flame was used with Li^7 vapor for absorption. The $\lg I/I_{06}$ plot shows a straight line with a maximum error of 2% for 2 to 91% C_6 concentrations. Orig. art. has: 1 equation.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Physicotechnical Institute, Academy of Sciences SSR)

SUBMITTED: 00	DATE ACQ: 19Dec63	ENCL: 00
SUB CODE: IC	NO REF SOV: 002	OTHER: 000

Card 2/2

ACCESSION NR: AP4042989 S/0051/64/017/001/0129/0134

AUTHORS: Zaydel', A. N.; Maly*shev, G. M.; Shreyder, Ye. Ya.

TITLE: On the sensitivity of spectral analysis

SOURCE: Optika i spektroskopiya, v. 17, no. 1, 1964, 129-134

TOPIC TAGS: spectrum analysis, light sensitivity, photometry, photographic emulsion, photoconductive detector

ABSTRACT: The effect of the method used to record the spectrum and of the parameters of the spectral instrument on the sensitivity of a spectral analysis is investigated as a function of the character of the intensity-measurement errors. It is shown that the nature of the errors determines the requirements governing the choice of the spectral instrument and the registration time. The optimal registration time in the analysis of small amounts of substance is estimated. If a photocathode is used as the radiation receiver, the decisive analysis error can be connected either with the features of the measuring circuit or with the fluctuations of the

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ACCESSION NR: AP4042989

measured signal, depending on the size of the noise background. In the case when an emulsion is used, the photometry area determines the type of predominating error, although the fluctuation error is decisive in the majority of cases. Regardless of the radiation receiver employed, the sensitivity of the analysis shows similar dependence on the spectral instrument parameters such as the spectral gap width, dispersion, and area of the dispersing element, so that the dependence of the sensitivity analysis on these parameters is affected primarily by the ratio of the two types of errors. The optimal registration time can be determined from the law of variation of the spectral line as the sample is consumed. Orig. art. has: 14 formulas.

ASSOCIATION: None

SUBMITTED: 26Jul63 ENCL: 00

SUB CODE: OP NR REF SOV: 009 OTHER: 003

Card 2/2

ZAYDEL', Aleksandr Natanovich; VIRKO, I.G., red.; OSTROVSKIY, Yu.I., red.

[Fundamentals of spectrum analysis] Osnovy spektral'nogo analiza. Moskva, Nauka, 1965. 322 p. (MIRA 18:4)

ZAYDEL', A.N.

Appraisal of measurement errors. Usp. fiz. nauk 85 no.2:391 F '65. (MIRA 18:3)

L 9207-66 EWT(1)/EEC(k)-2/T IJP(c)

ZAYDEL', Aleksandr Natanovich

[Elementary evaluations of measurement errors] Elementarnye otsenki oshibok izmerenii. Moskva, Nauka, 1965. 79 p. (MIRA 18:9)

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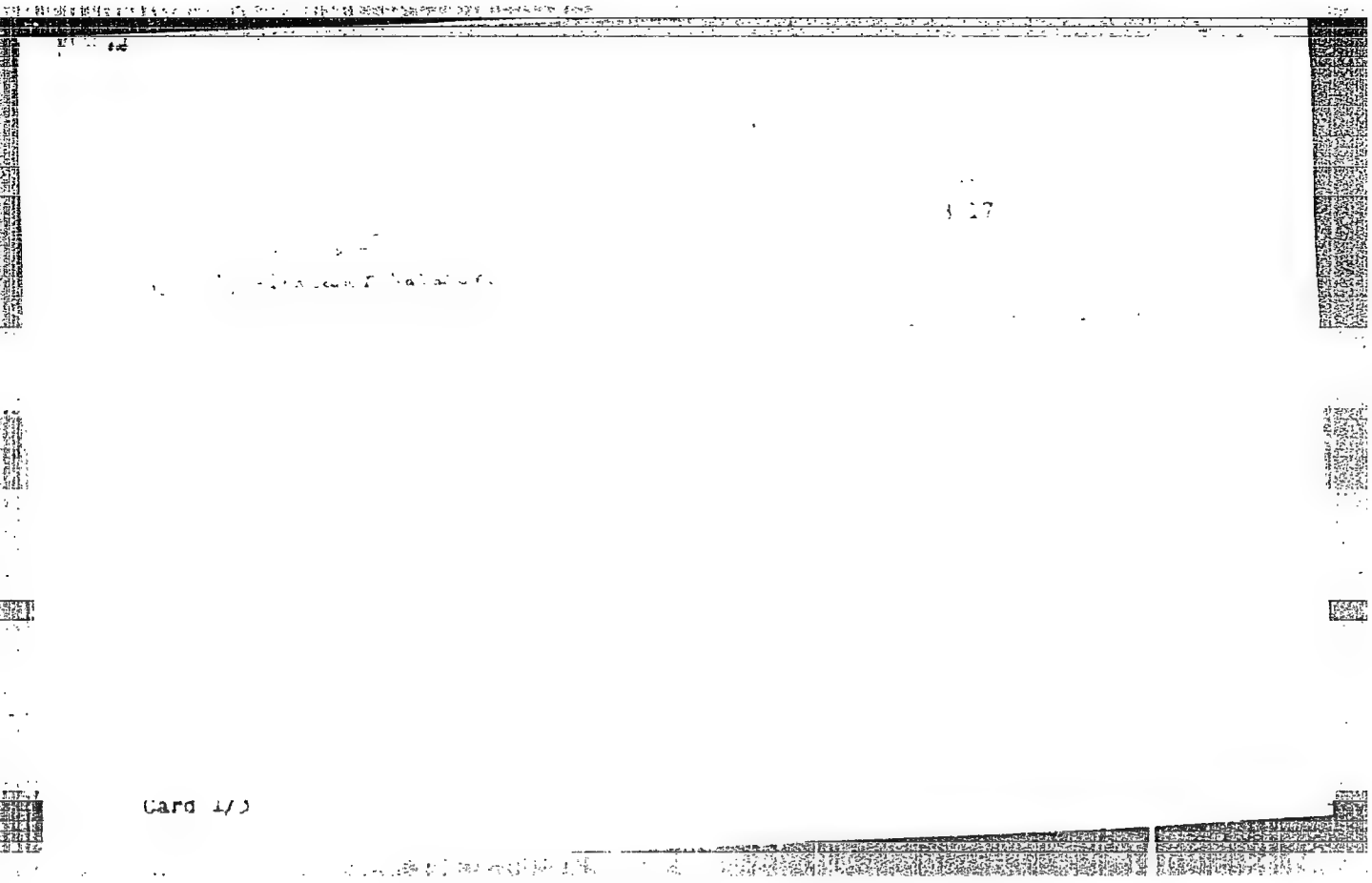

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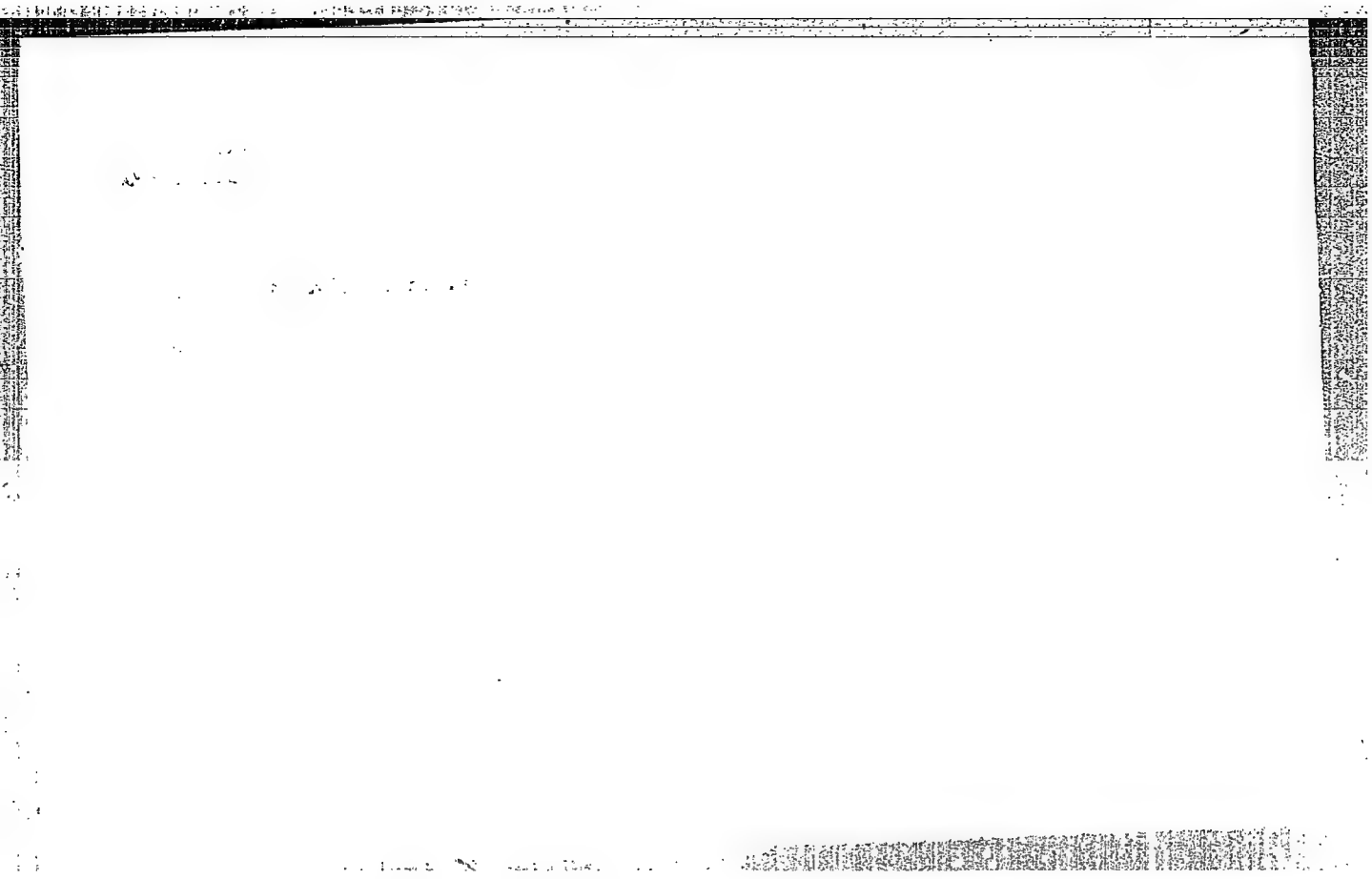

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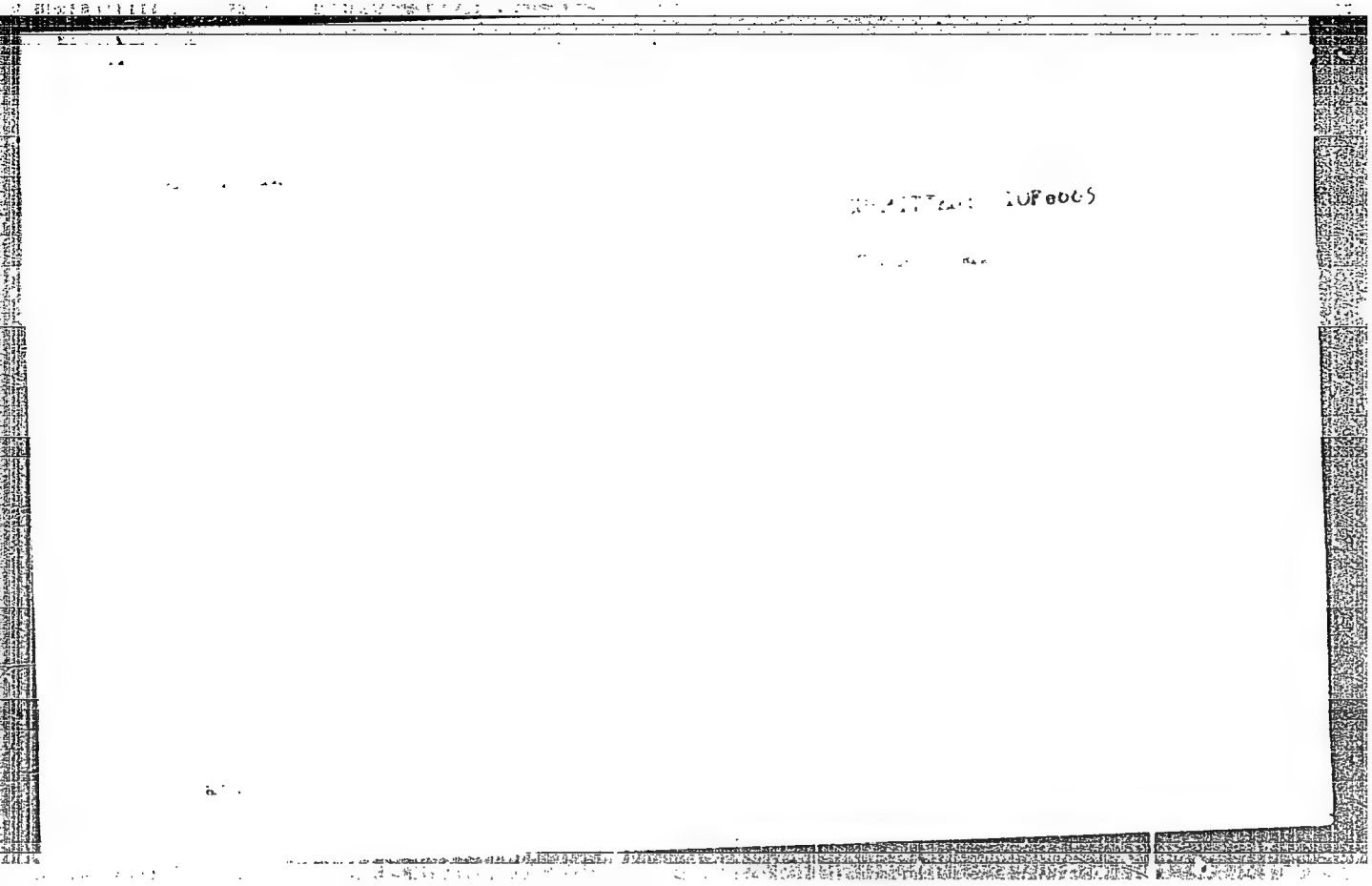

ACC NR: AP7004564 SOURCE CODE: UR/0077/66/011/005/0381/0382

AUTHOR: Zaydel', A. N.; Konstantinov, V. B.; Ostrovskiy, Yu. I.

ORG: Physico-technical Institute im. A. F. Ioffe, AN SSSR (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Laser resolution measurement

SOURCE: Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, v. 11, no. 5, 1966, 381-382

TOPIC TAGS: gas laser, photographic film, photographic emulsion, laser application/ Mikrat-600 photographic film

ABSTRACT: A brief description is given of an experimental use of a 6,328-angstrom neon laser as a source of light to measure the resolving power of Mikrat-600 film by the interference method. The "resolvograms" were studied by two methods, examination under the microscope and examination as transparent diffraction gratings, the second method being preferred because of simplicity, greater sensitivity and the ability to determine the frequency-contrast characteristics of emulsions, where by the ratio of brightness of the zero and the first diffraction maxima can be used as a measure of the contrast of the image, and can be measured directly. The authors thank T. M. Lovenborg for consultations. Orig. art. has: 2 figures. [JPRS: 38,961]

SUB CODE: 14, 20 / SUBM DATE: 29Apr66 / ORIG REF: 002 / OTH REF: 001

UDC: 535.824.8 : 621.375.9

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L 41090-66 EWT(1)/EWT(m)/FBD/EEC(k)-2/EWP(k)/T/EWP(t)/ETI IJP(c) WO/JD

ACC NR: AP6028628 SOURCE CODE: UR/0057/66/036/008/1506/1513

AUTHOR: Yevtushenko, T. P.; Zaydel', A. N.; Ostrovskaya, G. V.; Chelidze, T. Ya.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Spectroscopy of a laser spark. I. Spark in helium

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 8, 1966, 1506-1513

TOPIC TAGS: nonlinear optics, laser induced breakdown, gas breakdown, helium, argon, hydrogen, air breakdown, laser beam, spectroscopy, laser radiation spectrum, spectrum analysis

ABSTRACT: Laser induced breakdown in pure and hydrogen-doped helium under pressures from 1 to 10 atm and in air and Ar-H_2 mixtures was investigated spectroscopically. The laser "spark" was generated by means of a 0.5—1.0 J giant pulse (30—40 nanosec) ruby laser which was Q-switched by means of a rotating prism. The laser beam was focused by means of an f:25 mm lens into a metal chamber equipped with quartz windows which could be filled with gases at pressures up to 10 atm. The spark could be observed in the direction perpendicular to the laser beam. The magnified (1.6 times) spark image was focused onto the slit of an ISP-51 spectrograph by means of a Jupiter-3 objective. Spectra obtained in this manner indicate the spatial distribution of the spark emission. The temporal distribution of the spark was observed by means of an SFR photorecorder. A spectral analysis of the laser-induced spark in an

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$He-H_2$ mixture was made and photographs with the time resolution of various stages of the spark development were analyzed. The dependence of the H_β line halfwidth on the distance from the spark axis was shown. Tabulated data indicate the effect of pressure and the corresponding electron concentrations on linewidth broadening (see Table 1). The relative error of tabulated data was 20—30%. The preliminary results

Table.1. Linewidths in a laser spark spectrum in pure and hydrogen-doped helium at a pressure of 2 atm

Line, Å	Δλ, Å	$n_e \cdot 10^{-17}$, cm^{-3}	Line, Å	Δλ, Å	$n_e \cdot 10^{-17}$, cm^{-3}
He I 6678	12	2	He I 4471	25	0.5
He I 5876	10	1	He II 4686	90	60
He I 5016	9	1.6	H_α	10	1.8
He I 4713	5	0.5	H_β	60	1.2

indicate that the spark plasma goes through two stages. During the first stage (≈100 nanosec), the plasma has a high electron temperature and density ($\approx 10^{19}$ cm^{-3}), during which an intensive continuous spectrum is emitted and a considerable line broadening of the neutral and ionized atom occurs. The second stage, which lasts tens of μsec, corresponds to a gradual cooling of the plasma, during which only the neutral atoms radiate. The electron concentration in the initial development stage of a spark in He was found to be similar to that obtained for air breakdown elsewhere

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ACC NR: AP6028628

(S. A. Ramsden and W. E. R. Davis, Phys. Rev. Lett., 13, 227, 1964 ($5 \cdot 10^{17}$ cm^{-3}); and S. L. Mandel'shtam, P. P. Pashinin, A. V. Prikhindcyev, A. M. Prokhorov, and N. K. Sukhodrev, ZhETF, 47, 2003, 1964). A refined treatment of the present work will appear shortly. Orig. art. has: 7 figures and 2 tables. [YK]

SUB CODE: 20/ SUBM DATE: 22Mar66/ ORIG REF: 002/ OTH REF: 003/ ATD PRESS: 5057

Card 3/3 hs

L 44792-66 EWT(1)
ACC NR: AP6031276 SOURCE CODE: UR/0057/66/036/009/1718/1721

AUTHOR: Konstantinov, B. P.; Zaydel', A. N.; Konstantinov, V. B.; Ostrovskiy, Yu. I.

ORG: Physico-technical Institute im. A. F. Ioffe AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

49
B

TITLE: Holography. Experimental techniques and the resolution of method

25

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 9, 1966, 1718-1721

TOPIC TAGS: holography, hologram, laser photography, camera/Zenit-3m camera

ABSTRACT: Experimental holograms of half-tone and two- and three-dimensional objects were made by means of standard equipment assembled on an OSK-2 optical bench. A Zenit-3m camera was used with a 35-mm Mikrat-600 emulsion, whose maximum response was at 6400 Å. Resolution was not less than 1420 lines/mm. The quality of reconstructed images was enhanced by suppression of nonaxial modes. The angular resolution of 5 x 5 mm holograms was 3×10^{-4} radians for high-contrast reconstruction. Apparent quality degradation was observed in holograms which were 10 x 10 mm and larger. The degradation was attributed to effects caused by film bending and emulsion surface inhomogeneities. Orig. art. has: 3 figures. [YK]

SUB CODE: 14,20/ SUBM DATE: 27Apr66/ OTH REF: 002/ ATD PRESS: 5080

Card 1/1 blg

ACC NR: AP7001321 SOURCE CODE: UR/0057/66/036/012/2208/2210

AUTHOR: Zaydel', A. N.; Ostrovskaya, G. V.; Ostrovskiy, Yu. I.; Chelidze, T. Ya.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Holography of a laser spark with a temporal resolution

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 12, 1966, 2208-2210

TOPIC TAGS: holography, laser photography, plasma photography, Schlieren photography

ABSTRACT: Shadowgraphs of laser-induced air breakdown were taken by means of the 3-beam setup shown in Fig. 1, using a method of spatial-temporal separation of light pulses employing a system of semitransparent mirrors patented by one of the authors in 1963. Shadowgraphs can be made of various stages in the development of a single discharge. The shadowgraphs can be considered Gabor holograms of a laser spark. Image reconstruction was carried out by means of the system shown in Fig. 2. This system is actually a Schlieren setup in which the image is formed by rays deflected by the phase inhomogeneities of the object. The electron concentration N_e in a plasma was determined experimentally for different stages in the development of a plasma during two discharges. The average N_e for the first 120 nanosec (accuracy 30—50%) was 2.4×10^{19} cm^{-3}, which agrees favorably with results obtained from 1) displacement of the interference bands (A. Alcock, E. Panarella, S. Ramsden, 7th Intern. Conf.

Card 1/3 UDC: 533.9.07

ACC NR: AP7001321

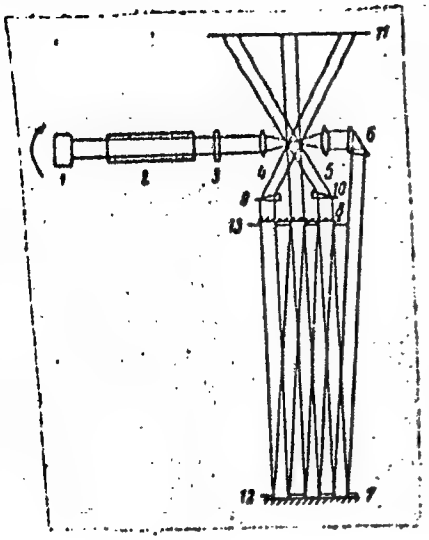

Fig. 1. Setup for obtaining shadowgraphs

1 - Rotating prism Q-switch; 2 - ruby crystal; 3 - glass plate; 4,5 - lenses; 6 - prism; 7 - mirror (99% reflective at 6943 A); 8 - mirror (50% reflective); 9, 10 - optical glass wedges; 11 - film; 12, 13 - diaphragms.

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ACC NR: AP7001321

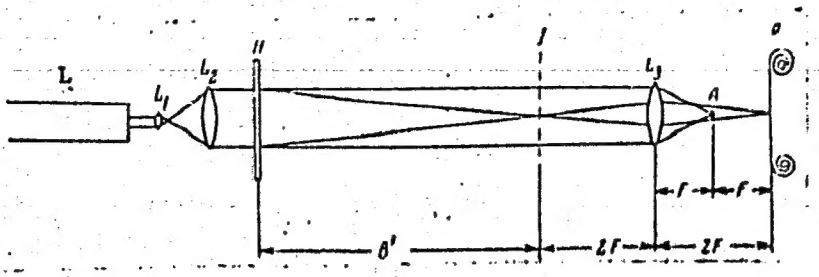

Fig. 2. Schematic for hologram reconstruction

H - hologram; L_1,L_2 - diverging lenses; L - He-Ne laser (6328 Å); I - image (real); L_3 - converging lens; P - film.

on Phenomena in Ionized Cases, 1965) and 2) a scattered laser beam (S. Ramsden, W. Davies, Phys. Rev. Letts., 13, 227, 1964). Orig. art. has: 2 formulas and 4 figures. [YK]

SUB CODE: 20/ SUBM DATE: 18May66/ ORIG REF: 003/ OTH REF: 006/ ATD PRESS: 5110

Card 3/3

NIKOL'SKIY, B.P., glav. red.; GRIGOROV, O.N., doktor khim. nauk, red.; FORAY-KOSHITS, B.A., doktor khim. nauk, red.; POZIN, [redacted] doktor khim. nauk, red.; ROMANKOV, P.G., red.; FRIDRIKHSBERG, D.A., kand. khim. nauk, red.; RABINOVICH, V.A., kand. khim. nauk, red.; RACHINSKIY, F.Yu., kand. khim. nauk, red.; ZAYDEL', A.N., doktor fiz.-mat. nauk, red.; ZASLAVSKIY, A.I., kand.khim. nauk, red.; MORACHEVSKIY, Yu.V., prof., red.; GRIVA, Z.I., red.; KOTS, V.A., red.; TOMARCHENKO, S.L., red.

[Chemist's handbook] Spravochnik khimika. 2., izd., perer. i dop. Moskva, Khimiia. Vol.4. 1965. 919 p. (MIRA 19:1)

1. Chlen-korrespondent AN SSSR (for Nikol'skiy, Romankov).

ACC NR: AP7004760 (A) SOURCE CODE: UR/0413/67/000/001/0082/0082

INVENTOR: Teterko, A. Ya.; Zaydel', B. M.

ORG: None

TITLE: An eddy-current method for detecting flaws in nonferromagnetic metals and determining their parameters. Class 42, No. 190049 [announced by the Physicomechanical Institute AN Ukrainian SSR (Fiziko-mekhanicheskiy institut AN Ukrainskoy SSR)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1967, 82

TOPIC TAGS: eddy current, flaw detection, electronic measurement, quality control

ABSTRACT: This Author's Certificate introduces an eddy-current method for detecting flaws in nonferromagnetic metals and determining their parameters. Gradiometer pickup signals are subjected to amplitude-phase analysis and the variation in the vector of the vertical component of the induction gradient in the field of eddy currents on the surface of the part being inspected is used for determining the depth and size of the flaw on the basis of experimental diagrams. Provision is made for adjustments to eliminate the effect of changes in the gap between the pickup and the part being inspected and changes in electrical conductivity and to increase productivity in determining flaw parameters. The change in the vector of the vertical component of the induction gradient in the field of eddy currents is displayed on the scope of a vacuum-tube

Card 1/2 UDC: 620.179.143

ACC NR: AP7004768

vectometer in the form of a hodograph of this vector in the complex plane. This complex plane is reproduced on the screen of a CRT with image persistence and the depth and size of the flaw are determined from the angle of inclination of the linear section of the hodograph to the polar axis and from the maximum length of this linear section.

SUB CODE: 13,09,11/ SUBM DATE: 17Dec65

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